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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/927,614	08/10/2001	Alan Rojer	1087.251	5343

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EXAMINER	
DIEP, NHON THANH	
ART UNIT	PAPER NUMBER

2621

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/927,614	ROJER, ALAN	
	Examiner	Art Unit	
	Nhon T. Diep	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 15 December 2006.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-15 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-15 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 8/10/2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948) .
 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____.
 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____.
 5) Notice of Informal Patent Application
 6) Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 4 is objected to because of the following informalities: Claim 4, ln. 8, after "from", "the the" should be changed to --the--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by HU (US 5,748,247).

Hu discloses a refinement of block motion vectors to achieve a dense motion field comprising the same process for refinement of a motion estimate, comprising the steps of:

accepting input, wherein said input comprises: a source image, a target image, a rectangular source block of pixels in the source image, a best motion estimate of said block from said source image to said target image, a bounding box wherein said bounding box contains said best motion estimate, a best prediction error for said best motion estimate (col. 1, ln. 47 – column 2, ln. 5), and a depth bound to limit the precision of the refinement (col. 4, ln. 14-15);

subdividing said bounding box to obtain a plurality of child bounding boxes, with a child motion estimate for each of said child bounding boxes (fig. 3, parent block 10, child blocks R1-R2-R3-R4 and col. 3, ln. 36-38);

evaluating said child motion estimate for each of said child bounding boxes to obtain a child prediction error for each of said child bounding boxes;

selecting from said evaluations of said child bounding boxes a best child bounding box, a best child motion estimate, and a best child prediction error (col. 4, ln. 6-10);

optionally, according to whether said depth bound is greater than zero, recursively refining said best child bounding box using said source image, said target image, said source block, said best child motion estimate, said best child bounding box, said best child prediction error, and said depth bound less one (col. 4, ln. 14-17);

optionally, according to whether said best child prediction error is smaller than said best prediction error, resetting said best prediction error and said best motion estimate to said best child prediction error and said best child motion estimate, respectively; and providing output, wherein said output comprises said best prediction error and said best motion estimate (fig. 3, child block R4 is further subdivided to 4 smaller blocks) as specified in claim 1; wherein said subdivision step uses a quadtree subdivision providing four child bounding boxes (fig. 3) as specified in claim 2.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over HU (US 5,748,247).

As applied to claim 1 above, Hu further discloses an initial bounding box is selected such that the center of said initial bounding box is said initial motion estimate; and said succession of trial motion estimates is obtained by selection of the centers of bounding boxes obtained by recursive quad-tree subdivision of the initial bounding box (fig. 3) as specified in claim 9; wherein said initial bounding box is selected to have a dimensions of 1 X 1 pixels (NXM block and per pixel level) as specified in claim 10; wherein said quad-tree recursive subdivision of bounding boxes is restricted to the particular bounding box at each recursive step which minimizes said measure of error obtained by said prediction and said evaluation of the trial motion estimate associated with each successive bounding box (col. 3, ln. 32 – col. 4, ln. 17) as specified in claim 11 and to save computational time, Hu only uses candidate vectors to find the best child vector (the one with minimum DFD measure) instead of performing texture mapping with involving texture mapping a region of size equal to said block of pixels from said target image where said region in said target image is displaced from the position of said block of pixels in said source image by translation according to said trial motion estimate as specified in claims 4, 8 and 12. However, texture mapping as indicated in the Background of the Invention was known as a highly effective and widespread

technique from computer graphics (page 2, ln. 8-10). And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Hu by applying texture mapping in finding the best child motion vector. Doing so would help to improve efficiency.

Regarding to claims 5-7, 13-15: Since, using either the average of the absolute differences between said source block and said prediction block on a pixel by pixel basis or the square root of the average of the squared differences between said source block and said prediction block on a pixel by pixel basis or the maximum of absolute differences between said source block and said prediction block on a pixel by pixel basis to obtain find best match are all well known techniques and therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to use any of the above techniques to obtain the best match for motion estimation.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hu (US 5,748,247), in view of Oruga (US 6,061,397).

As applied to claim 1 above, it is noted that Hu does not particularly disclose the child motion estimate for each of the said child bounding boxes is the center of said child bounding box as specified in claim 3, however, Hu suggests to have motion vector search down to a per pixel level and Oruga teaches per pixel motion vector search (fig. 6) wherein a center point of a 3 X 3 block represents a one pixel motion vector and is part of the searching process for a final motion vector. Doing so would help to obtain better motion vector and to avoid motion artifacts.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
 - a. Chiang et al (US 6,084,908) discloses apparatus and method for quadtree based variable block size motion estimation.
 - b. HU (US 6,987,866) discloses multi modal motion estimation for video sequences.
 - c. Jeannin (US 5,929,940) discloses method and device for estimating motion between images, system for encoding segmented images.
 - d. Bottreau et al (US 6,985,526) discloses a SNR scalable video encoding method and corresponding decoding method.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhon T. Diep whose telephone number is 571-272-7328. The examiner can normally be reached on m-f.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ND
3/15/2007



**NHON DIEP
PRIMARY EXAMINER**